REMARKS

Claims 1-5, 7-9, 11-12, 14-16, and 18-19 stand rejected on prior art grounds. Claims 1-5, 7-9, 11-12, 14-16, and 18-19 are also rejected for failing to point out and distinctly claim the subject matter of the invention. Applicants respectfully traverse these rejections based on the following discussion. Claims 12 and 19 are herein cancelled. Claims 21-27 are newly added. Thus, claims 1-5, 7-9, 11, 1-16, 18 and 21-27 are all the claims presently pending in the application.

I. The 35 U.S.C. §112, Second Paragraph, Rejection

Claims 1-5, 7-9, 11-12, 14-16, and 18-19 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office Action indicated that the "inconsistency between the language in the preamble "an apparatus" and certain portions of the body of the claim such as "two parts of a workpiece and interconnects" renders the scope of the claim vague and indefinite because it is unclear if the intent is to claim either the subcombination of the "an apparatus" alone or the combination of the "an apparatus" and "two parts of a workpiece and interconnects"." Independent claims 1, 8 and 15 are amended herein to overcome the rejection and, specifically, to clarify that what is being claimed by the Applicants is an apparatus and that one feature of this claimed apparatus is a frame that is configured to hold a workpiece (or in the case of claim 8 configured to hold a device) in a specified manner.

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II. The Prior Art Rejections

Claims 1-2, 4-5, 15-16, and 18-19 stand rejected under 35 U.S.C. §102(b) as being anticipated by Heid (U.S. Patent No. 6,063,188). Claims 3, 7-9, 11-12, and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Heid. Applicants respectfully traverse these rejections. Specifically, the Applicants submit that Heid does not teach or suggest the following patentable features in amended independent claim 1: (1) "at least one partial-circle structure above said frame"; and (2) "wherein said frame is configured to hold a workpiece having two parts connected by interconnects such that said at least one partial-circle structure is positioned to pass between said two parts and break said interconnects when released by said at least one temperature-sensitive release." The Applicants further submit that Heid does not teach or suggest the following patentable features in amended independent claim 8: (1) "at least one solder removal structure comprising one of a partial-disk, a blade and a knife above said frame"; (2) "at least one temperature-sensitive release operably connected said at least one solder removal structure;" (3) "wherein said frame is configured to hold a workpiece, comprising a two parts connected by solder balls, such that said at least one solder removal structure is positioned to pass between said two parts and break said solder balls when released by said at least one temperature-sensitive release"; and (4) "wherein said two parts comprise one of a chip and substrate and a substrate and carrier". Finally, the Applicants submit that Heid does not teach or suggest the following patentable features in amended independent claim 15: (1) "at least one axle extending vertically through said upper part of said frame"; (2) "at least one partial-circle structure connected to said at least one axle such that rotation of said at least one axle rotates said at least one partial-circle structure"; (4) "at least one temperature-sensitive release operably connected to said at least one axle"; (5) "wherein said at least one axle is spring-loaded to rotate when released by said at least one temperature sensitive release and"; (6) "wherein said frame is adapted to hold a worpiece, comprising two parts connected by interconnects, such that said at least one partial-circle structure is positioned to pass between said two parts and to break said interconnects, when rotated."

More particularly, Heid teaches a crucible (10) that has a hinged bottom (16, 18) that is held in place by a latch (20) when the crucible (10) is at a certain temperature. The latch (20) is connected to a temperature-sensitive mechanism (24-26) that moves the latch (20), allowing the hinged bottom (16, 18) of the crucible (10) to open and spill the contents of the crucible (see Abstract, col. 1, line 64-col. 2, line 14, and Figures 1-3).

Contrarily, the present invention teaches an apparatus for breaking interconnects (e.g., solder balls) that connect two parts of a workpiece (see paragraphs [0020-0022]). For example, the two parts of the workpiece can be a chip and a substrate or a substrate and a carrier (see paragraphs [0021] and [0025]). The apparatus specifically comprises a frame (i.e., a holding fixture or apparatus) that is configured to hold the workpiece such that interconnect/solder removal structure(s) are positioned so they can pass between the two parts of the workpiece in order to break the interconnects/solder balls (see paragraphs [0022-0025] and Figures 2-5). An interconnect/solder removal structure can, for example, comprise a partial-circle or partial-disc structure, a blade, a knife, a squeegee, plow, or any other structure that has the capability of passes between the two parts of the workpiece to remove the interconnects/solder balls (see paragraphs [0022] and [0033])). Each partial-circle structure (or other interconnect/solder removal structure) is rotationally biased (i.e., spring-loaded) to pass between the two parts of the workpiece (see paragraph [0022]). Release of the spring-loaded mechanism is via a temperature sensitive release (see paragraph [0026]). That is, for each partial-circle structure (or other interconnect/solder removal structure) an axle extends vertically through the upper part of the frame and rotation of the axle rotates the partial-circle structure (see paragraph [0025] and Figure 3). A temperature sensitive release moves a pin causing a spring to force the axle to rotate, thereby causing the partial-circle structure (or other interconnect/solder removal structure) (i.e., the temperature sensitive release is operable connected to a spring-loaded partial-circle structure) (see paragraph [0025] and [0027]). A stop member can limit the rotational movement of the partial-circle structure (or other interconnect/solder removal structure) (see paragraph [0028]). Additionally, a torsion spring adjuster can return the partial-circle structure to its spring-loaded position (see paragraph [0029]).

A. Rejection Of Independent Claim 1 Based On Heid.

As mentioned above, the Applicants submit that Heid does not teach or suggest the following patentable features in amended independent claim 1: (1) "at least one partial-circle structure above said frame" and (2) "wherein said frame is configured to hold a workpiece having two parts connected by interconnects such that said at least one partial-circle structure is positioned to pass between said two parts and break said interconnects when released by said at least one temperature-sensitive release."

The Office Action rejected claim 1 and its dependent claims 2 and 4-5 stating " Heid discloses 20 is a partial-circle structure, 24 is a release, different releases (col. 5, lines 55-56), 16 is interconnect, crystals are workpieces located inside the crucible, it is inherent that crystals fall out from the crucible when 16 is opened, see col. 3, lines 45-53." The Applicants respectfully disagree.

As mentioned above, Heid teaches a crucible (10) that has a hinged bottom (16, 18) that is held in place by a latch (20) when the crucible (10) is at a certain temperature. The latch (20) is connected to a temperature-sensitive mechanism (24-26) that moves the latch (20), allowing the hinged bottom (16, 18) of the crucible (10) to open and spill the contents of the crucible (see Abstract, col. 1, line 64-col. 2, line 14, and Figures 1-3).

As illustrated in Figure 1 of Heid, the latch (20) is not a partial-circle structure, but rather a hook-shaped structure that is positioned on the side and hooks under the bottom (16) of the crucible (10). Furthermore, item (16) is clearly not an "interconnect" connecting two parts of a workpiece but rather a bottom of a crucible that is hinged (18) and held up by the latch (20).

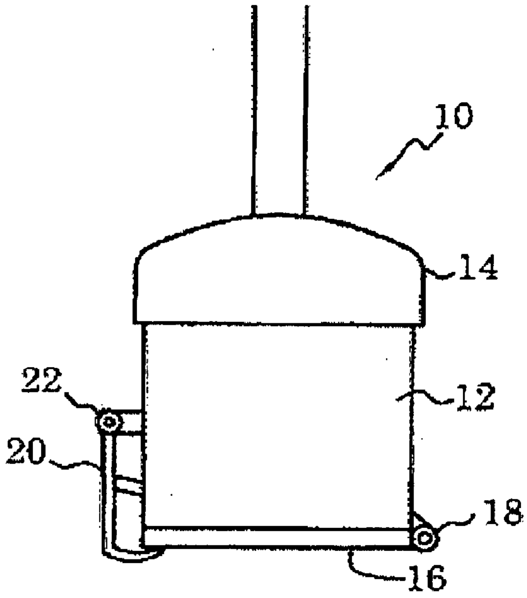

FIG. 1

The Office Action cites the crystals that are located inside the crucible as disclosing the workpieces of the present invention and further states that "it is inherent that crystals fall out from the crucible when 16 is opened." The claimed invention operates upon a single workpiece that has two parts connected by interconnects, not multiple workpieces. Additionally, because the apparatus of the present invention operates to break the interconnects that connect two parts of a workpiece, the combination of the bottom of the crucible and the crystals contained in the crucible can not be viewed as disclosing the interconnect and workpiece features. That is, the bottom of the crucible does not connect any parts of the crystals (it just contains the crystals within the crucible). Furthermore, the Examiner does not address the fact that in the present invention the "partial-circle structure is positioned to pass between said two parts and break said interconnects when released by said at least one temperature-sensitive release". That is, even if the crystals in the crucible 10 disclose a workpiece, the latch 20 discloses a partial-circle structure, and the bottom 16 discloses an interconnect, the latch 20 is never positioned to **pass between two parts** of the workpiece and to break the interconnect when released by the temperature-sensitive release (i.e., as illustrated in Figure 3, the latch 20 moves away from the bottom 16 so the crystals which spill out, it never passes between anything).

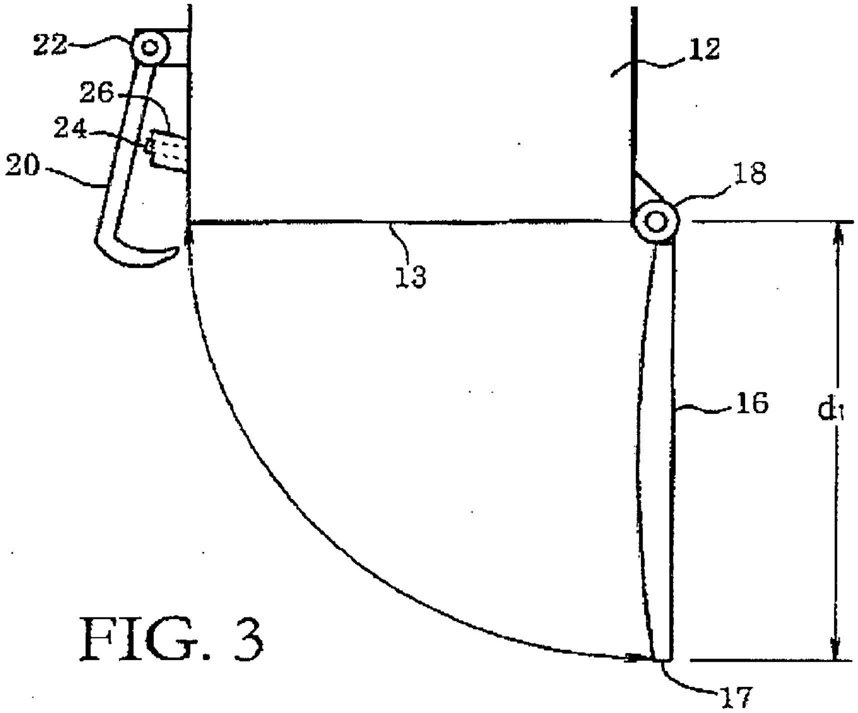

FIG. 3

Therefore, amended independent claim 1 is patentable over Heid. Further, dependent claims 2-5, 7, 21 and 24 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings, and no new matter is being added. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

B. Rejection Of Independent Claim 8 Based On Heid.

The Applicants further submit that Heid does not teach or suggest the following patentable features in amended independent claim 8: (1) "at least one solder removal structure comprising one of a partial-disk, a blade and a knife above said frame"; (2) "wherein said frame is configured to hold a workpiece, comprising a two parts connected by solder balls, such that said at least one solder removal structure is positioned to pass between said two parts and break said solder balls when released by said at least one temperature-sensitive release"; and (3) "wherein said two parts comprise one of a chip and substrate and a substrate and carrier".

The Office Action also rejected claim 8 and its dependent claims for the same reasons as it rejected claim 1 and its dependent claims (i.e., "Heid discloses 20 is a partial-circle structure, 24 is a release, different releases (col. 5, lines 55-56), 16 is interconnect, crystals are workpieces located inside the crucible, it is inherent that crystals fall out from the crucible when 16 is opened, see col. 3, lines 45-53."). Again, the Applicants respectfully disagree for the same reasons set out above with regard to claim 1.

Additionally, as amended, claim 8 claims "at least one solder removal structure comprising one of a partial-disk, a blade and a knife above said frame". The latch (20) of Heid is a hook-shaped structure that is positioned on the side and hooks under the bottom (16) of a crucible (10) to hold the bottom (16) closed. This latch (20) is not for removing solder, nor is it a partial-disk, a blade or a knife.

Furthermore, as amended, claim 8 claims an apparatus that acts upon a workpiece that has two parts connected by solder balls, rather than the more broad interconnects of claims 1 and 15. The bottom (16) of Heid is clearly not a solder ball. Furthermore, the two parts of the workpiece upon which the apparatus of the present invention acts are either a chip and substrate or a substrate and carrier. Thus, the crystals contained within the crucible of Heid are clearly not the same as the workpiece of the present invention.

Therefore, amended independent claim 8 is patentable over Heid. Further, dependent claims 9, 11, 14, 22 and 25 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings, and no new matter is being added. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

C. Rejection Of Independent Claim 15 Based On Heid.

The Applicants also submit that Heid does not teach or suggest the following patentable features in amended independent claim 15: (1) "at least one axle extending vertically through said upper part of said frame"; (2) "at least one partial-circle structure connected to said at least one axle such that rotation of said at least one axle rotates said at least one partial-circle structure"; (3) "at least one temperature-sensitive release operably connected to said at least one axle"; (4) "wherein said at least one axle is spring-loaded to rotate when released by said at least one temperature sensitive release and"; and (5) "wherein said frame is adapted to hold a worpiece, comprising two parts connected by interconnects, such that said at least one partial-circle structure is positioned to pass between said two parts and to break said interconnects, when rotated."

The Office Action also rejected claim 15 and its dependent claims for the same reasons as it rejected claim 1 and its dependent claims (i.e., "Heid discloses 20 is a partial-circle structure, 24 is a release, different releases (col. 5, lines 55-56), 16 is interconnect, crystals are workpieces located inside the crucible, it is inherent that crystals fall out from the crucible when 16 is opened, see col. 3, lines 45-53."). Again, the Applicants respectfully disagree for the same reasons set out above with regard to claim 1.

Additionally, as amended claim 15 claims "at least one axle extending vertically through said upper part of said frame" and "at least one partial-circle structure connected to said at least one axle such that rotation of said at least one axle rotates said at least one partial-circle structure". No where in Heid does it disclose an axle extending vertically through and upper part of the apparatus frame. Furthermore, rotation of the latch of Heid (which the Examiner equates to the partial-circle structure) is not a function of the rotation of an axle to which the latch is attached. Rather the latch (20) of Heid rotates around a hinge (22) and the latch itself is forced to rotate on the hinge when it is directly pushed by a temperature-sensitive release pin (24).

Furthermore, as amended claim 15 also claims "at least one temperature-sensitive release operably connected to said at least one axle" and "wherein said at least one axle is spring-loaded to rotate when released by said at least one temperature sensitive release". Again, the latch (20) of Heid rotates around a hinge (22) and the latch itself is forced to rotate on the hinge when it is directly pushed by a temperature-sensitive release pin (24). There is no temperature sensitive release in Heid that is operably connected to a spring-loaded axel that rotates upon release by the temperature sensitive release.

Therefore, amended independent claim 15 is patentable over Heid. Further, dependent claims 16, 18, 23 and 26-27are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings, and no new matter is being added. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

D. Newly Added Dependent Claims 21, 22 and 23

It should be noted that the reservoir feature that was previously presented in claim 8 has been deleted from independent claim 8 and is now presented in dependent claims 21, 22 and 23, which depend from independent claims 1, 8 and 15, respectively.

The Office Action rejected this feature as unpatentable over Heid indicating that Heid discloses a reservoir. However, claims 21, 22, 23 of the present invention comprises a frame that comprises at least one reservoir positioned to receive material from said interconnects (or solder balls as in claim 22) broken by said at least one partial-circle structure (or solder removal structure as in claim 22). While Heid does disclose a reservoir (i.e., a separate bowl) to collect the contents which drop out of the crucible when the bottom is opened up, this resevoir is not a part of the apparatus itself and it is not positioned to receive material from the interconnects/solder balls that are broken by the latch (rather it receives what the Examiner has cited as the workpiece when the bottom of the crucible is opened).

III. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1-5, 7-9, 11, 14-16, 18 and 21-27, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0458.

Respectfully submitted,

Dated: 1/17/07

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